

Series 130 Ozone Controller

User Guide



Distributor: Wessex Power Technology Ltd, Dorset
Tel: +44 (0)845 520 0303 | Fax: +44 (0)845 520 0304
Email: wpt@wessexpower.co.uk | www.wessexpower.co.uk

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1.0 Ozone Controller Components

Series 130 Ozone Controller

The following components are supplied with the Series 130 Ozone Controller:

- Series 130 controller assembly inside an FRP enclosure
- Ozone sensor head plugged in
- User guide
- Wall fixing brackets
- Eight pole M12 male cable connector

Please check that all these components have been supplied and contact your dealer or Aeroqual on email at: sales@aeroqual.com if any of the components are missing.

2.0 Setting up the Ozone Controller

2.1 Monitor Assembly

The Series 130 Ozone Controller comes pre-assembled and ready for use. It is however recommended that the installer carries out the following:-

- Open the plastic enclosure by loosening the four screws and remove the lid.
- Ensure that the sensor head is firmly located into the location slot in the metal mounting plate and that it is also firmly located between the plastic inlet and outlet nozzles, which penetrate through the sides of the enclosure. Should this not be the case, then follow the instructions for removing and replacing the sensor head on the following page.
- The unit is factory set with the dip switches set to operate in alarm mode with the alarm set points at 0.100ppm and 0.300ppm. If this is not suitable, follow the instructions for re-setting these controls on page 8.
- Wire up the male end of the M12 cable connector and test the system.

2.2 Power Requirements

The Series 130 controller is designed to be powered by a 24VDC, power supply (user supplied). The permissible voltage range is between 16VDC and 28VDC.

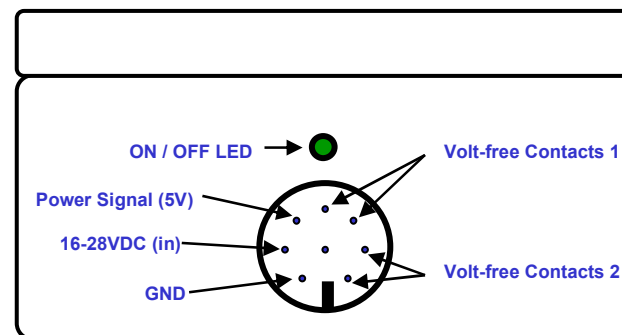
Ensure that the power supply to the unit is sized to account for the voltage drop across the connecting cable so that it delivers at least 16VDC(minimum) to the Series 130.

The unit does not have an On/Off switch and is activated when power is supplied to the unit. Before powering up the unit, ensure that all the necessary wiring connections are correctly in place.

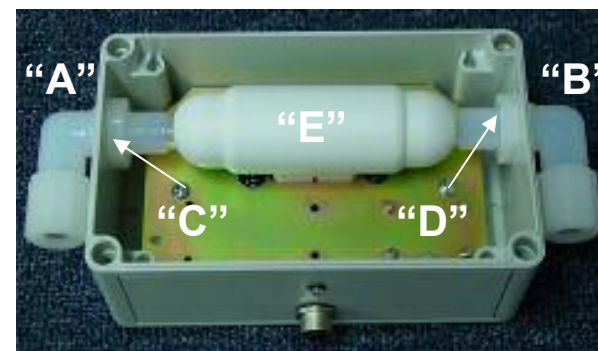
NOTE: Do not insert or remove the sensor head while power is being supplied to the unit.

2.3 External Control Wiring

The M12 '8-pole' connector configuration, viewed from the outside of the enclosure is as shown below. (Note the centre pole is not used)



2.4 Removing and Replacing the Sensor Head



- Undo the four lid screws, remove lid and view the interior of the enclosure as shown above.
- Unscrew and remove the inlet & outlet nozzles "A" & "B" as well as the corresponding lock-nuts "C" & "D".
- Remove the sensor head "E".
- Now replace the sensor head (keyed to fit one way only) and re-position nozzles "A" & "B".
- Finally, tighten lock-nuts "C" & "D".

3.0 Modes of Operation

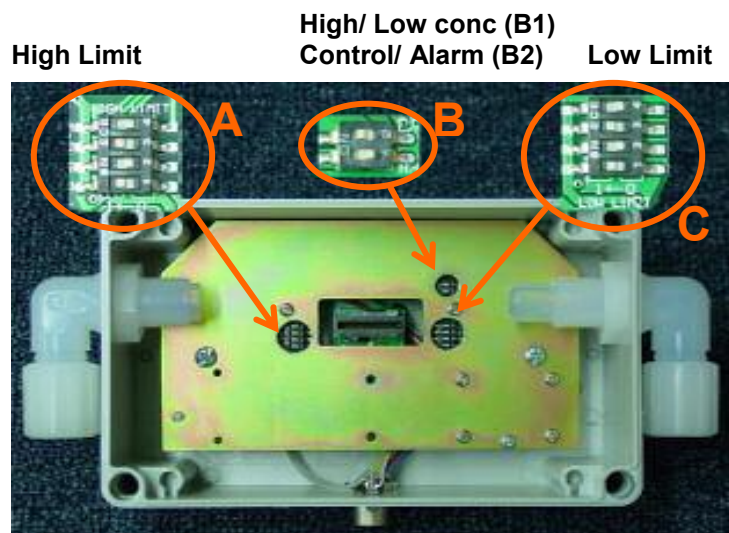
The Series 130 can operate either as a controller or an alarm switch. These modes control the two on-board relays in different ways. The required operating mode is selected via dipswitches as outlined below.

3.1 Warm up

Warm up the controller to burn off contaminants on the sensor. During warm up the LED will flash green slowly. If the controller has not been run for a few days it may take an hour or two to reach full accuracy.

3.2 Operating in Low or High Ozone Environments

The controller can operate either low or high ozone concentration sensor heads by setting the dip-switch B-1 to the "off" position for a low concentration head and "on" for a high concentration head.

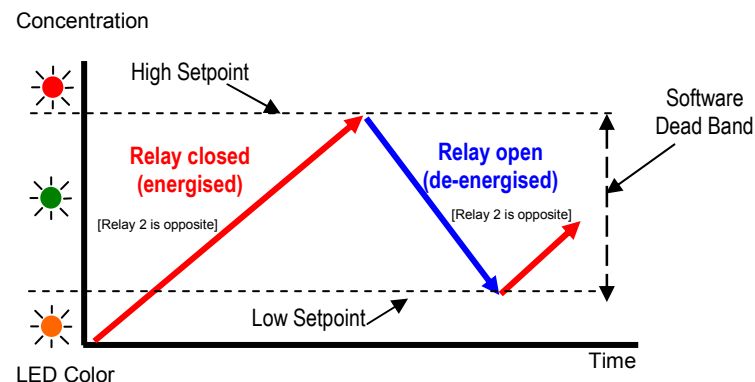


3.3 Operating as a Controller

Set the mode dip switch (B-2) to position "off". Set the low ("C") and high ("A") control limits ['dead band'] by configuring the dip switches as per the dip switch table on page 8. When in control mode relay 1 operates as per the table and diagram below. Relay 2 is opposite.

Controller mode LED, Relay and Status

Ozone	LED	Relay 1	Relay 2
below low limit	ORANGE	closed	open
between low and high limits	GREEN	*closed if ozone concentration rising *open if ozone concentration falling	*open if ozone concentration rising *closed if ozone concentration falling
Above high limit	RED	open	closed
Sensor fault	RED FLASH	open	closed
Settings fault	ORANGE FLASH	open	open



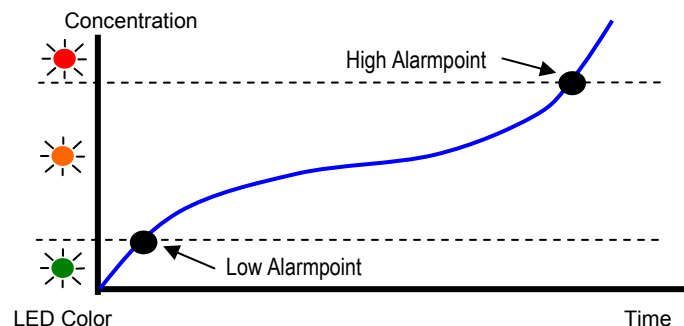
3.4 Dual Alarm Mode

Set the mode dip switch (B-2) to the dual alarm switch position – "on". Set the low ("C") and high limits ("A") by configuring the dip switches as per the dip switch table on page 8. In this mode the low limit dip switch controls Relay-1 and the high limit dipswitch controls Relay-2. The relay and LED status is given in the table below.

Dual Alarm Switch mode LED, Relay and Status

Ozone	LED	Relay 1	Relay 2
below low limit	GREEN	open	open
between low and high limits	ORANGE	closed	open
above high limit	RED	closed	closed
Sensor fault	RED FLASH	open	open
Settings fault	ORANGE FLASH	open	open

i If one of the dip switches is set to zero in this mode then the corresponding relay will be non-operational and set to open. If sensor failure occurs then both relays are de-energised.



3.5 Summary of LED Indicators

LED Color	Meaning
Controller Mode	
Green (2 sec flashing)	Warm up (10 minute cycle)
Orange	Below low setpoint
Green	Between low and high setpoint
Red	Above high setpoint
Dual Alarm Switch mode	
Green (2 sec flashing)	Warm up (10 minute cycle)
Green	Below low setpoint
Orange	Between low and high setpoint
Red	Above high setpoint
Diagnostics	
Red (0.5 sec flashing)	Sensor failure or Sensor not connected properly
Orange (2 sec flash)	Dipswitches set incorrectly

3.6 Inlet Port Maintenance

The inlet port must be kept clean at all times. The port incorporates a stainless steel mesh that stops dust and lint from entering the sensor head. In dusty environments, this mesh can become blocked with dust and lint. Remove dust and lint manually. Replacement mesh filters are available.

3.7 Dip Switch Settings

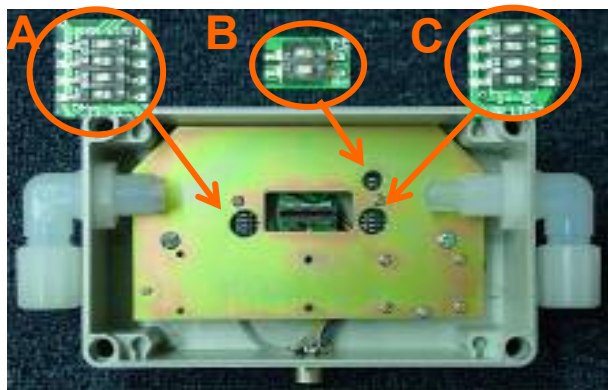
NOTE: If the high set point is set equal to or lower than the low set point, the LED on the unit will Flash Orange. The exception is when the unit is set to dual alarm switch mode and one of the dipswitches is set to zero.

High/Low Dipswitch

off	Low Sensor head
on	High Sensor head

Control/Alarm Dipswitch

off	Control
on	Alarm



High Setpoint Dipswitch				Setpoints	
1	2	3	4	Low Sensor (ppm)	High Sensor (ppm)
off	off	off	off	0.000 ¹	0.000 ¹
on	off	off	off	0.020	0.200
off	on	off	off	0.030	0.400
on	on	off	off	0.040	0.600
off	off	on	off	0.050	0.800
on	off	on	off	0.060	1.000
off	on	on	off	0.070	1.500
on	on	on	off	0.080	2.000
off	off	off	on	0.090	3.000
on	off	off	on	0.100	4.000
off	on	off	on	0.150	5.000
on	on	off	on	0.200	6.000
off	off	on	on	0.250	7.000
on	off	on	on	0.300	8.000
off	on	on	on	0.400	9.000
on	on	on	on	0.500	10.000

¹not valid in control mode

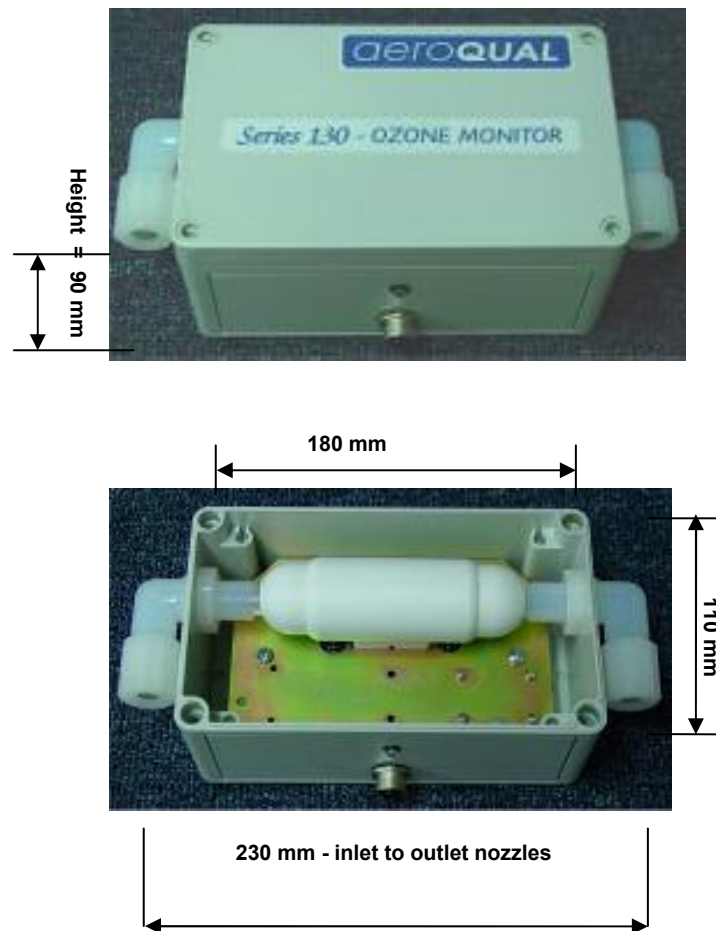
Low Setpoint Dipswitch				Setpoints	
1	2	3	4	Low Sensor (ppm)	High Sensor (ppm)
off	off	off	off	0.000 ¹	0.000 ¹
on	off	off	off	0.010	0.100
off	on	off	off	0.020	0.200
on	on	off	off	0.030	0.400
off	off	on	off	0.040	0.600
on	off	on	off	0.050	0.800
off	on	on	off	0.060	1.000
on	on	on	off	0.070	1.500
off	off	off	on	0.080	2.000
on	off	off	on	0.090	3.000
off	on	off	on	0.100	4.000
on	on	off	on	0.150	5.000
off	off	on	on	0.200	6.000
on	off	on	on	0.250	7.000
off	on	on	on	0.300	8.000
on	on	on	on	0.350	9.000

¹not valid in control mode

4.0 Specifications – Series 130

Sensor type	Gas Sensitive Semiconductor
Measurement range	Low concentration Ozone Head 0.000 to 0.500 ppm High concentration Ozone Head 0 to 10 ppm
Accuracy	Low concentration Ozone Head ± 0.008 ppm (0 to 0.100 ppm) ± 10% (0.100 to 0.500 ppm) High concentration Ozone Head ± 10% (0.00 to 1.00 ppm) ± 15% (1.00 to 10.00 ppm)
T90 response rate (standard)	Low concentration Ozone Head 70 seconds High concentration Ozone Head 60 seconds
Operating temperature range	-5°C to 40°C
Relative humidity limit	5% to 95%
Removable / replaceable sensor heads	Yes
Control & Alarm set points	Dip switches
Control or dual switch mode setting	Dip switch
Relay connection for control & switching	Volt free contacts (Max voltage 28V) (Max current 150mA)
Power Requirements:	24 VDC
Enclosure size (see page 10):	180mmL x 110 mmW x 90mmD (enclosure only) 230mmL x 110mmW x 90mmD (including nozzles)

5.0 Dimensions



6.0 Troubleshooting

Fault description	Possible cause	Remedy
No power	Lead connection broken Power supply failure Damaged base electronics	Reconnect power lead Replace 12V power supply Replace base
Sensor failure when new sensor	Insufficient warm up Air contaminated Sensor not plugged in Sensor damaged	Run the sensor for 24-48 hours Move the sensor to a cleaner environment and check reading Plug in the sensor properly Replace sensor
Sensor showing high reading under zero gas conditions	Background gas level higher than normal Interferent gas present Sensor zero drift Sensor damaged	Move sensor to clean air to recheck Move sensor to clean air to recheck Re-zero sensor in a clean stable background Replace sensor
Sensor showing higher than expected reading in the presence of sensor gas	Zero calibration incorrect Span calibration incorrect Sensor correct Interferent gas present Sensor Calibration lost	Zero calibrate sensor Span calibrate sensor Check calibration of gas generator Move sensor to clean air and check reading upon exposure to known gas concentration Replace / refurbish sensor
Sensor output noisy	Power supply noise Local air flow too high Environmental conditions fluctuating	Install regulated power supply Reduce air flow Reduce fluctuations
Sensor showing lower than expected reading in the presence of sensor gas	Zero calibration incorrect Span calibration incorrect Sensor correct Sensor inlet contaminated Interferent gas present Gas reactive and decomposing before detection Sensor calibration lost	Zero calibrate sensor Span calibrate sensor Check calibration of gas generator Clean sensor inlet filter and mesh Move sensor to clean air and check reading upon exposure to known gas concentration Move the monitor closer to the source of the gas Replace / refurbish the sensor
Red LED (0.5sec flash)	Sensor failure Sensor not connected properly	Replace sensor Remove and re-insert sensor correctly
Orange LED (2sec flash)	Dipswitch set incorrectly	Check dipswitch settings and adjust

7.0 Appendix

7.1 Copyright

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Aeroqual reserves the right to revise this document or withdraw it at any time without prior notice. The availability of particular products may vary by region. Please check with the Aeroqual dealer nearest to you.

7.2 Statement of Compliance

1. The Aeroqual Series 130 Ozone Monitors comply with EN 55022: 1998
2. The Aeroqual Series 130 Ozone Monitors comply with EN 61000-6-1: 2001
3. The Aeroqual Series 130 Ozone Controller complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
 - (i) these devices may not cause harmful interference, and
 - (ii) these devices must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



7.3 Warranty

Thank you for purchasing this Aeroqual product. To get maximum use of the features of your new product we recommend that you follow a few simple steps:

- Read the guidelines for safe and efficient use.
- Read all the terms and conditions of your Aeroqual Warranty.
- Save your original receipt. You will need it for warranty repair claims. Should your Aeroqual product need warranty service, you should return it to the dealer from whom it was purchased or contact Aeroqual.

Our Warranty

Aeroqual warrants this product to be free from defects in material and workmanship at the time of its original purchase by a consumer, and for a subsequent period as stated in the following table:

Products	Warranty Period
Series 130 Controller	One year from the date of purchase
High Ozone Concentration Head	Six months from the date of purchase
Low Ozone Concentration Head	Six months from the date of purchase

All accessories for the product are covered by a warranty for a period as follows:

Accessories	Warranty Period
Other Accessories	One year from the date of purchase

This warranty is expressly limited to the original owner who purchases the equipment directly from Aeroqual or from an authorized Aeroqual dealer.

What we will do

If, during the warranty period, this product fails to operate under normal use and service, due to improper materials or workmanship, Aeroqual subsidiaries, authorized distributors or authorized service partners will, at their option, either repair or replace the product in accordance with the terms and conditions stipulated herein.

Conditions

1. The warranty is valid only if the original receipt issued to the original purchaser by the dealer, specifying the date of purchase, is presented with the product to be repaired or replaced. Aeroqual reserves the right to refuse warranty service if this information has been removed or changed after the original purchase of the product from the dealer.
2. If Aeroqual repairs or replaces the product, the repaired or replaced product shall be warranted for the remaining time of the original warranty period or for ninety (90) days from the date of repair, whichever is longer. Repair or replacement may be via functionally equivalent reconditioned units. Replaced faulty parts or components will become the property of Aeroqual.
3. This warranty does not cover any failure of the product due to normal wear and tear, damage, misuse, including but not limited to use in any other than the normal and customary manner, in accordance with Aeroqual's user guide for use, faulty installation, calibration and maintenance of the product, accident, modification or adjustment, events beyond human control, improper ventilation and damage resulting from liquid or corrosion.
4. This warranty does not cover product failures due to repairs, modifications or improper service performed by a non-Aeroqual authorized service workshop or opening of the product by non-Aeroqual authorized persons.
5. The warranty does not cover product failures which have been caused by use of non-Aeroqual original accessories.
6. Tampering with any part of the product will void the warranty.
7. Damage to the sensors can occur through exposure to certain sensor poisons such as silicones, tetraethyl lead, paints and adhesives. Use of Aeroqual sensors in these environments containing these materials may (at the discretion of Aeroqual) void the warranty on the sensor head. Exposure to levels of ozone outside of the design range of a specific Aeroqual sensor head can adversely affect the calibration of that sensor head and will also void this warranty as it applies to the replacement of sensor heads.
8. Aeroqual makes no other express warranties, whether written or oral, other than contained within this printed limited warranty. To the fullest extent allowable by law all warranties implied by law, including without limitation the implied warranties of merchantability and fitness for a particular purpose, are expressly excluded, and in no event shall Aeroqual be liable for incidental or consequential damages of any nature whatsoever, however they arise, from the purchase or use of the product, and including but not limited to lost profits or business loss.

Some countries restrict or do not allow the exclusion or limitation of incidental or consequential damage, or limitation of the duration of implied warranties, so the preceding limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which may vary from country to country.

7.4 Guidelines on How to Measure Ozone

The following information is presented to help users operate their **Aeroqual Ozone Controller** in the most effective and efficient manner.

General

- Ozone is heavier than air and tends to sink. Thus detection of leaks from ozone generating equipment should be performed at the most appropriate position.
- Ozone will react and decompose on surfaces such as walls, furniture etc.
- Smell is not a reliable test for the presence or concentration of ozone as the odour threshold varies widely between people and is affected by local ambient conditions.

Permanent Controller Placement

- The **Aeroqual Ozone Controller** has been designed to measure the ambient concentration of ozone. The controller must not be placed directly in an ozone stream.
- For indoor local area monitoring attach the controller to an inert surface such with the inlet unobstructed.
- For leak detection mount the unit near the ozone equipment.
- Ensure that the controller is protected from excessive water splashing, dust, vibration, excessive heat or cold, high concentrations of ozone and excessive swings in humidity.

False Readings

- The Aeroqual Ozone Controller has been designed to respond selectively to ozone, however other oxidizing gases such as chlorine and nitrogen dioxide can generate false readings if they are at high concentrations. High concentrations of hydrocarbon gases such as vapours of alcohol, oils and solvents can reduce and mask the concentration of ozone.
- Ozone will react with and decompose on organic substances. *The presence of human beings may reduce the local ozone concentration.*

NOTES

[illegible]